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Remarks

Applicants and their representatives wish to thank Examiner Jackson for indicating the allowability of Claims 9-12, 26-27, and 45. Claims 9, 26 and 45 have been rewritten in independent form, including all of the limitations of any base claim(s). Claims 2-5 and 10-12 depend from Claim 9, and Claims 19-22, 24, and 27-28 depend from Claim 26. Therefore, Claims 2-5, 9-12, 24, 26-28, and 45 are in condition for allowance.

The remaining independent claims concern:

- An adjustable segmented amplifier comprising a first fixed stage configured to amplify an analog signal and provide a first amplified output at a first common node; and an adjustable stage comprising a plurality of independently selectable parallel amplifier segments, each of the parallel amplifier segments having an input at the first common node and an output at a second common node, where each of the parallel amplifier segments comprises a transistor having a control terminal and a first inductor in electrical communication with the control terminal of the transistor, and the adjustable stage is configured to provide an output signal in one of a plurality of power ranges corresponding to a number of selected parallel amplifier segments, the output signal having a minimum power efficiency when two or more of the parallel amplifier segments are selected (see claim 1);
- A circuit, comprising means for amplifying an analog signal to provide a first amplified signal; means for providing an adjustably amplified output from the first amplified signal; and means for selecting an output power range for the adjustably amplified output comprising a plurality of parallel, independently selectable means for further amplifying the first amplified signal, comprising an input at a first common node, a transistor having a control terminal, a first means for coupling said control terminal of said transistor to a bias signal, and an output at a second common node (see claim 18); and
- A method of amplifying an analog signal, comprising the steps of amplifying an analog input signal in a fixed amplifier stage; selecting one or more parallel amplifier segments

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for subsequent signal amplification, where each of the parallel amplifier segments comprises a transistor having a control terminal and a first inductor in electrical communication with the control terminal of the transistor, and amplifying the amplified analog signal with the activated, parallel, selectable amplifier segments, to generate an output signal in a unique output power range corresponding to the number of selected parallel amplifier segments (see claim 65).

The primary cited reference (Brandt, U.S. Patent No. 6,538,515; hereinafter, "Brandt") fails to disclose, teach, suggest or provide any motivation to include a transistor and an inductor in electrical communication with the control terminal of a transistor in each of a plurality of segments in an adjustable segmented amplifier, as recited in claims 1, 18 and 65. The secondary cited references fail to cure all of the deficiencies of Brandt with respect to the present claims 1, 18 and 65. Thus, the present claims 1, 18 and 65 are fully patentable over the cited references.

The Objections to Claims 33-34, 37, 47, 52-53, 56, 59, and 61

The objection to Claim 52 is respectfully traversed.

Claim 52 relates to an integrated circuit comprising the circuit of Claim 18, whereas Claim 37 relates to a system for broadcasting an analog signal, comprising the integrated circuit of Claim 32. Applicants' undersigned representative is not certain how one might reasonably expect a claim to an integrated circuit (e.g., Claim 52) to somehow include a system for broadcasting an analog signal (e.g., Claim 18). Thus, it would appear that any expectation that Claim 52 should depend from Claim 37 is probably based on something other than the language of the claims. It is entirely proper -- and arguably even expected -- that a claim to an integrated circuit (e.g., Claim 52) would comprise a circuit (e.g., Claim 18). Reconsideration of this objection is respectfully requested.

The objection to Claims 37, 47, 52, 56, 59, and 61 is respectfully traversed.

The USPTO has issued a number of patents that include claims of the format considered indefinite in the Office Action. For example, U.S. Patent Nos. 7,026,839 (e.g., Claims 15, 26,

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77, 89 and 91), 6,995,694 (e.g., Claims 11 and 27), 6,985,033 (e.g., Claims 21 and 23), 6,956,510 (e.g., Claims 20, 115, 116, 118, 230, 231, 241, 242, 244 and 245), and 6,940,107 (e.g., Claims 18 and 32) all contain a number of claims in a format common to the present Claims 37, 47, 52, 56, 59, and 61. Thus, on at least four (4) occasions, the USPTO has determined that the format of the present Claims 37, 47, 52, 56, 59, and 61 is not indefinite. Reconsideration of this objection is respectfully requested.

The objection to Claims 33-34 and 53 including the term "at least about" is respectfully traversed.

Results of an electronic keyword search in U.S. Patent Collection database (see <http://patft.uspto.gov/netahtml/PTO/search-bool.html>) for the term "at least about" in the claims of U.S. Patents issued since 1975 identified 66,296 such patents (see the attached printout of the search results) setting precedence for the use of the term in the claims. Therefore, the USPTO has indicated at least 66,296 times that such language in the claims is acceptable. Withdrawal of this objection is respectfully requested.

The Objection to the Title

The objection to the Title of the invention has been obviated by appropriate amendment, as suggested by the Examiner.

The Rejection of Claims 17 and 31 under 35 U.S.C. § 112

The rejection of Claims under 35 U.S.C. § 112 as being indefinite is obviated in part and respectfully traversed in part.

Results of an electronic keyword search in U.S. Patent Collection database (see <http://patft.uspto.gov/netahtml/PTO/search-bool.html>) for the term "substantially" in the claims of U.S. Patents issued since 1975 identified 842,644 such patents (see the attached printout of the

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search results) setting precedence for the use of the term in the claims. Therefore, the USPTO has indicated at least 842,644 times that such language in the claims is acceptable.

The terms "size", "design", and "power efficiency" are terms of art, known to those skilled in the art. Therefore, the terms are not indefinite. Exemplary passages using the terms "size", "design", and "power efficiency" can be found in the specification at [0004]-[0006] on pages 2-3, paragraphs [0031]-[0033] on pages 11-12, [0037] on page 14, paragraph [0040] on page 15, paragraph [0048] on page 17, paragraphs [0062]-[0063] on page 22, and etc. Particular attention is drawn to Figure 6A-6B, and the corresponding discussion thereof in paragraphs [0047]-[0048] on pages 17-18. Therefore, this basis for rejection is unsustainable, and should be withdrawn.

The objection to the use of the term "and/or" has been obviated by appropriate amendment.

Therefore, this ground of rejection is unsustainable, and should be withdrawn.

The Rejection of Claims 1-8, 13-25, and 28-36 under 35 U.S.C. § 103(a)

The rejection of Claims 1-8, 13-25, and 28-36 under 35 U.S.C. § 103(a) as being unpatentable over Brandt in view to Klaren et al. has been obviated in part and is respectfully traversed in part.

Claims 2-5 now depend from allowable Claim 9, and Claims 24 and 28 now depend from allowable claim 26, as explained above. Therefore, this ground of rejection should be withdrawn with regard to Claims 2-5, 24 and 28 for at least the foregoing reason.

With regard to Claims 1, 18, and 65, Brandt concerns a power amplifier that operates at a high efficiency over a wide power range (Abstract, ll. 1-2). The power amplifier includes multiple circuits connected in parallel, with a transistor and a resistor included in each circuit. Each transistor is connected to a supply voltage through a controllable connector, such as a switch or a linear regulator. Each transistor is also connected at a source/drain terminal through an inductor to a shunt capacitor to ground (col. 1, ll. 39-43, and Fig. 2). The circuits could be

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turned on/off in any combination, by disconnecting from a voltage supply (col. 3, ll. 5-6, and Fig. 2). While disconnected from the supply voltage, the transistor's bias voltage is increased, thereby forming a low resistance path to ground. The inductance increases since the inductors are no longer parallel with each other when the inductor is connected to ground and in parallel with the shunt capacitor (col. 1, ll. 50-56). The increase in the inductance causes the increase in the capacitance of the collector, which results in realization of a high efficiency at the lower output power (col. 1, ll. 57-60).

In contrast to the present claims 1, 18, and 65, Brandt does not disclose (i) an amplifier that includes a first fixed stage configured to amplify an analog signal and provide a first amplified output at a first common node, or (ii) an adjustable stage comprising a plurality of segments, each segment comprising a transistor having a control terminal and a first inductor in electrical communication with the control terminal of the transistor (see, e.g., claims 1 and 65; claim 18 contains similar language, but recited in "means-plus-function" format). Therefore, Brandt is saliently deficient with respect to claim 1, 18, and 65.

The claimed arrangement of a transistor having a control terminal in electrical communication with an inductor enables the Q of the resonant circuit between the inductor and a capacitance of the transistor(s) to be sufficiently low to further enable inter-stage matching between the first fixed stage and the transistor(s) of the adjustable stage segment(s). In such a configuration, for example, inter-stage matching may be substantially unaffected when one or more additional amplifier segments are turned on or off (page 13, paragraph [0036], ll. 14-19). Such results and/or capabilities as a result of the claimed transistor-inductor arrangement in an adjustable segmented amplifier stage are not suggested by the cited references. The present invention enables the functionality and/or capabilities described herein, while being capable of integration onto a single chip without additional components that might be otherwise necessary, further results that are also not suggested by the cited references.

Klaren et al. fails to disclose or suggest the claimed transistor-inductor arrangement in an adjustable segmented amplifier stage. Therefore, Klaren et al. fails to cure the deficiencies of Brandt with respect to the present claims 1, 18, and 65.

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Klaren et al. discloses a balanced power amplifier circuit arrangement that provides the benefits of bypassing the driver amplifier or balanced amplifier stage in order to conserve power, comprising a driver amplifier stage adapted to receive and amplify a signal (Abstract, ll. 1-3). Klaren et al. appears to be silent with regard to an adjustable stage comprising a plurality of independently selectable parallel amplifier segments, each of the segments comprises a transistor having a control terminal and a first inductor in electrical communication with the control terminal of the transistor, as recited in claims 1, 18, and 65. Therefore, Klaren et al. does not appear to cure the deficiencies of Brandt with respect to claims 1, 18, and 65.

Claims 6-8, 13-17, 19-23, 25, and 29-36 depend directly or indirectly from Claims 1 and 18, and are therefore allowable for at least the same reasons as Claims 1 and 18. As a result, this ground of rejection is unsustainable, and should be withdrawn.

The Rejection of Claims 2-5 under 35 U.S.C. § 103(a)

The rejection of Claims 2-5 under 35 U.S.C. § 103(a) as being unpatentable over Brandt and Klaren et al. in view of Gillis has been obviated in part by appropriate amendment and respectfully traversed in part.

Claims 2-5 now depend from allowable Claim 9. Therefore, Claims 2-5 are allowable over Brandt and Klaren et al. in view of Gillis for at least the foregoing reason. However, Claim 1 represents a combination of original Claims 1 and 4. As a result, this ground of rejection is traversed with respect to Claim 1 and claims dependent therefrom.

As discussed above, Brandt in view of Klaren et al. are saliently deficient with respect to the previous claims 1, 18, and 65. Gillis fails to cure the deficiencies of Brandt in view of Klaren et al.

Gillis concerns a balanced power amplifier for radio frequencies (Abstract, ll. 1). The amplifier comprises a bias circuit configured to generate first and second bias voltages which are applied via a radio frequency inductor choke connected to the base of a bipolar transistor. In operation, a selection control signal is applied to the bias circuit, changing the bias voltage on the

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bipolar transistor depending on whether the transistor is to be operated in the linear mode or saturation mode (col. 2, ll. 39-45).

In contrast to the present invention, the inductor choke as taught by Gillis merely facilitates the supply of the bias voltage from the bias circuit to the transistor, depending on whether the transistor is to be operated in the linear mode or saturation mode. Gillis does not disclose or suggest that including an inductor in electrical communication with the control terminal of a transistor in each of a plurality of adjustable stage segments enables a fixed stage at the common input to the adjustable stage to resonate with the capacitance of the transistors in the adjustable stage. By resonating with the capacitance of an amplifier output device (such as the transistors in the adjustable stage segments), the inductor in each adjustable stage segment helps to present a real and higher impedance termination for an inter-stage matching network. Gillis neither discloses nor suggests that his transistor-inductor configuration would have such capability or functionality in a segment of an adjustable amplifier stage containing a plurality of such segments, as recited in claim 1, 18, and 65.

Furthermore, Gillis does not disclose or suggest that the inductor choke would enable an adjustable stage of a power amplifier containing a plurality of segments comprising such a transistor-inductor arrangement to have a distinct class AB operation (see paragraph [0071], page 25, ll. 8-10 of the present specification). The transistor-inductor circuit as claimed may have a sufficiently low Q to allow the impedance and the frequency of the signal amplified by the amplifier containing a parallel plurality of such transistor-inductor circuits to remain relatively constant, and the bandwidth relatively insensitive to the number of segments that are on, without resort to a microwave passive array or adaptation of large-scale power circuitry. Other power amplifiers with class AB operation tend to be wideband or they tend to use external microwave power. Gillis does not appear to suggest combining a plurality of such transistor-inductor circuits in parallel in an adjustable stage of a power amplifier, much less the possibility of such functionality and/or results upon doing so.

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Therefore, Gillis does not appear to cure the deficiencies of Brandt and Klaren et al. Consequently, Claims 1, 18 and 65 (and all claims depending directly or indirectly therefrom) are allowable over Brandt and Klaren et al. in view of Gillis.

The Rejection of Claims 37-42 and 47-64 under 35 U.S.C. § 103(a)

The rejection of Claims 37-42 and 47-64 under 35 U.S.C. § 103(a) as being unpatentable over Brandt and Klaren et al. in view of Khorram is respectfully traversed.

As explained above, the combination of Brandt and Klaren et al. are saliently deficient with regard to an adjustable stage comprising a plurality of independently selectable parallel amplifier segments, where each of the segments comprises a transistor having a control terminal and an inductor in electrical communication with the control terminal of the transistor. Khorram fails to cure the deficiency of Brandt in view of Klaren et al. as recited in claims 1 and 18, from which claims 37-40, 42, and 47-64 depend.

Khorram discloses a linear high powered integrated circuit transmitter for wireless communication systems. The transmitter comprises an up-conversion module, balanced integrated circuit coupling, a plurality of power amplifiers, and a combining circuit (Abstract, ll. 1-3). In operation, the combining circuit is coupled to combine the plurality of amplified RF signals to produce a linear RF signal with an output power greater than 7 dBm (col. 2, ll. 27-28).

With regard to the present claims 37-40, 42, and 47-64, Khorram does not disclose a broadcasting system comprising an adjustable stage that includes a plurality of independently selectable parallel amplifier segments, where each of the segments comprises a transistor having a control terminal and a first inductor in electrical communication with the control terminal of the transistor, as explained above with regard to Claims 1 and 18.

Furthermore, Khorram does not disclose a broadcasting system comprising either (i) an adjustable segmented amplifier comprising an adjustable stage that includes a plurality of independently selectable parallel amplifier segments or (ii) an adjustable resistor coupled to an output inductor. The plurality of power amplifiers disclosed by Khorram do not appear to be

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adjustable, unlike the amplifier recited in the present Claim 41, which allows each individual segment in the adjustable stage of the amplifier to be turned on or off. Instead, the plurality of power amplifiers disclosed by Khorram appears to produce a plurality of differential signals. (Similarly, the plurality of power amplifiers disclosed by Khorram does not appear to have an output at a common node.) In addition, the baluns as disclosed by Khorram do not appear to include an adjustable resistor coupled thereto, as recited in the present claim 41 (note the similar limitation in allowable Claim 45). Therefore, Khorram does not appear to cure the deficiencies of Brandt and Klaren et al. with regard to the present Claim 41.

Therefore, this ground of rejection is unsustainable, and should be withdrawn.

The Rejection of Claim 43 under 35 U.S.C. § 103(a)

The rejection of Claim 43 under 35 U.S.C. § 103(a) as being unpatentable over Brandt, Klaren et al., and Khorram in view of Endou et al. has been obviated in part and is respectfully traversed in part.

As explained above, the combination of Brandt, Klaren et al., and Khorram are saliently deficient with regard to a broadcast system comprising an adjustable stage comprising a plurality of independently selectable parallel amplifier segments, where each of the segments comprises a transistor having a control terminal and a first inductor in electrical communication with the control terminal of the transistor, as recited in Claim 1.

Endou concerns a grounded-base transistor amplifier which is capable of almost completely cancelling a noise voltage generated by a constant-current circuit of the amplifier, thereby achieving an extremely low noise figure (NF), comprising a differential amplifier with input and output transformers to convert the differential amplifier for single ended input and output, as well as first and second output capacitors respectively coupled to each line of the differential output signal. Endou appears to be silent with regard to an adjustable amplifier stage comprising a plurality of independently selectable parallel segments, each segment comprising a

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transistor having inductor in electrical communication with the control terminal of the transistor, as recited in Claim 1.

Since Claim 43 depends indirectly from Claim 1, Claim 43 is patentable over the combination of Brandt, Klaren et al., Khorram and Endou for essentially at least the same reasons as Claim 1. Therefore, this ground of rejection is unsustainable, and should be withdrawn.

The Rejection of Claims 44 and 46 under 35 U.S.C. § 103(a)

The rejection of Claims 44 and 46 under 35 U.S.C. § 103(a) as being unpatentable over Brandt, Klaren et al., and Khorram in view of Davis is respectfully traversed.

As explained above, the combination of Brandt, Klaren et al., and Khorram are saliently deficient with regard to a broadcast system comprising (i) an adjustable stage comprising a plurality of independently selectable parallel amplifier segments, where each of the segments comprises a transistor having a control terminal and a first inductor in electrical communication with the control terminal of the transistor, as recited in Claim 1, and (ii) a signal converter configured to provide a converted analog output signal from the output of the adjustable amplifier, as recited in Claim 37 (from which Claims 44 and 46 depend, indirectly).

Davis concerns an amplifier with variable gain which maintains high Q when saturated, comprising first and second output inductors and a differential output capacitor coupled to each line of the differential output signal as well as a directly coupled output and a transformer forming a resonant circuit with capacitor for differential or single ended inductive output coupling. Davis does not appear to disclose or suggest an adjustable amplifier stage comprising a plurality of independently selectable parallel amplifier segments, where each of the segments comprises a transistor having an inductor in electrical communication with the control terminal thereof. Therefore, Davis does not appear to cure the deficiencies of Brandt, Klaren et al., and Khorram.

Therefore, this ground of rejection is unsustainable, and should be withdrawn.

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The Rejection of Claims 65-76 under 35 U.S.C. § 103(a)

The rejection of Claims 65-76 under 35 U.S.C. § 103(a) as being unpatentable over Ghanadan et al. in view of Klaren et al. is respectfully traversed.

Ghanadan et al. discloses a power amplifier system and method using adaptive distribution of signals through an amplifier architecture of parallel amplifier stages. In contrast with the present Claim 65, Ghanadan does not disclose or suggest a method comprising the steps of amplifying an analog signal *in a fixed amplifier stage*, or amplifying an amplified analog signal with activated parallel, selectable amplifier segments, each comprising a transistor having a control terminal and a first inductor in electrical communication with the control terminal of the transistor. Therefore, Ghanadan et al. is deficient with regard to the present Claim 65.

Klaren et al. fails to cure the deficiencies of Ghanadan with respect to the present Claim 65.

Klaren et al. discloses a balanced power amplifier circuit arrangement that provides the benefits of bypassing the driver amplifier or balanced amplifier stage in order to conserve power, comprising a driver amplifier stage adapted to receive and amplify a signal (Abstract, ll. 1-3). Klaren et al. also appears to be silent with regard to an adjustable stage comprising a plurality of independently selectable parallel amplifier segments, where each of the segments comprises a transistor having a control terminal and a first inductor in electrical communication with the control terminal of the transistor, as recited in Claim 65. Therefore, Klaren et al. does not appear to cure the deficiencies of Ghanadan et al. with respect to Claims 65-76.

Therefore, this ground of rejection is unsustainable, and should be withdrawn.

Conclusions

Applicants and their representatives again wish to thank Examiner Jackson for indicating the allowability of Claims 9-12, 26-27, and 45 over the prior art.

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In view of the above amendments and remarks, all bases for rejection are overcome, and the application is in condition for allowance. Early notice to that effect is earnestly requested.

Respectfully submitted,



Andrew D. Fortney, Ph.D.
Reg. No. 34,600

401 West Fallbrook Avenue, Suite 204
Fresno, California 93711
(559) 432 - 6847

ADF:jfs